RISKY PLACES

Climate change discourse and the transformation of place on Moch (Federated States of Micronesia)

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Abstract

Scientific predictions of climate change that place small islands 'at risk' from sea-level rise and an increase in the frequency and intensity of extreme climatic events are well accepted by Small Island States. This paper discusses responses to climate change discourse on Moch Island, a coral atoll in the Mortlock Islands of Chuuk State, Federated States of Micronesia. We examine climate change discourse in terms of how it contributes to the constitution of 'risky environments', and focus on how the concept of 'risk' contributes to the way that people currently engage with and understand their island places. Whilst a past history of human resourcefulness in response to social and environmental change in the Pacific is well documented in the literature, the contemporary discourse of climate change introduces a notion of risk that stifles people's agency and trust in the effectiveness of their own knowledge and practices.

Keywords

Micronesia, climate change, risk and uncertainty, local knowledge

Introduction

In recent years, increasing attention has been drawn to alarming scientific predictions about the vulnerability of Small Island States to the impacts of climate change. In this paper we examine the role of climate change discourse in the constitution of 'risky environments', and how the concept of 'risk' affects the way that people engage with and understand their island places. We focus on Chuuk State, Federated States of Micronesia (FSM), where we conducted fieldwork over a period of two weeks in January 2008.[i] We were initially invited to conduct the study during a short fieldtrip in November 2006, to Weno, the capital of Chuuk State to meet with Chuukese Government officers and local residents about their concerns regarding climate change and its social impacts. During this trip, interviews were conducted with four men from the Mortlock

Islands, a group of outer islands approximately 300km south-east of Weno (see Figure 1). All expressed deep concern regarding the impacts of climate change on their ways of life and on what the future might bring for them. Mr Doropio Marar, historical research officer with the Historic Preservation Office (HPO), suggested that a research team return to Chuuk to conduct further study on his home island of Moch, in Satawan Atoll in the Mortlock Islands.

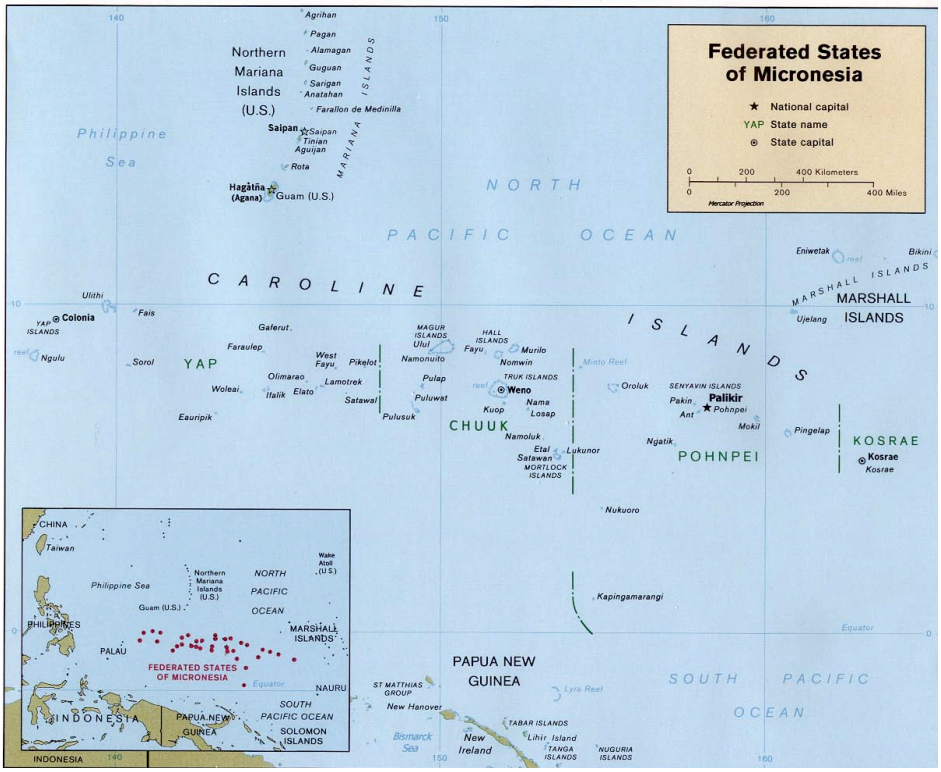

Figure 1: Mortlock Islands in Chuuk State, FSM
(http://commons.wikimedia.org/wiki/Atlas_of_the_Federated_States_of_Micronesia)

In response to this invitation, a team from James Cook University returned to Chuuk in January 2008 to conduct further research (Henry et al, 2008). Our project involved discussions with government officers in Weno and Pohnpei, the island capitals of Chuuk State and the FSM respectively, and a fieldtrip to Moch Island. We spent four days on Moch, a typical coral atoll island, 0.28 square km in area and with a resident population of approximately 600 people. Moch has a flat topography, and whilst the exact elevation is not recorded, the maximum elevation of islands in the Mortlocks is 3-5 m above sea-level (Buden, 2007: 416). Houses are distributed between three villages, Inapwei, Peimoch, and Eor, and are concentrated on the lagoon side of the island. The only source of water on Moch is rain which percolates through the coral soil and forms a freshwater lens which supports a large central taro patch surrounded by many smaller ones, breadfruit and coconut trees. As is the case for all Outer Island regions of Chuuk, subsistence activities remain the primary way of life on Moch. The main subsistence

activities include fishing, horticulture (taro, breadfruit, coconut), and small animal husbandry (pigs and chickens).

Our fieldwork on Moch (Figure 2) consisted of formal interviews and informal discussions with people about their experiences of climatic events, the changes they have noticed on the island, and what the causes of these changes might be. The interviews were formally arranged through appropriate community channels by Mr Doropio Marar. We conducted five formal interviews with three men and two women, all of whom were over 60 years old and considered to be elders of the community. The interviews were open-ended and semi-structured around particular themes relating to the causes and effects of climatic events and noticeable environmental changes on Moch. We interviewed people at their homes, and walked with them as they showed us the special places affected by typhoons, storm surges and 'high tide'. Interviews were also actively solicited by two younger men who were eager to share their experiences of extreme climatic events and to show us the impacts of climatic events on their island places. Permission was granted to audio-tape the interviews. Informal discussions and conversations occurred regularly throughout our time on Moch and contributed significantly to the study.

Figure 2: Moch Island, 2008 (photograph by William Jeffery)

The construction of small islands as places of risk

The Intergovernmental Panel on Climate Change (IPCC) refers to small island places as "being amongst the most vulnerable countries to the impacts of climate change, sea-level rise, and extreme climatic events". According to the 'Small Islands' chapter of the 4th IPCC Report (Mimura et al, 2007: 690, 695, 697), projected sea-level rise poses a 'high risk' to low-lying islands, temperature projections place marine resources of small

islands at 'great risk', small islands are 'highly vulnerable' to waves and storm surges, there is a strong possibility of 'higher risks' of extreme events such as cyclones, and a dependency on rainfall increases the vulnerability of small islands to climate change.

Whilst atoll environments may indeed be threatened by climatic changes, such 'overwhelming prognostications of doom' capture the public imagination and further reinforce the consensual science of climate change that defines small islands as risky places. Farbotko (2010: 48-49) critiques the "spectacle of the disappearing islands" as journalists, researchers and environmentalists flock to the Pacific Island nation of Tuvalu to witness flooding and storm surge events, which are often prefaced in the context of climate change. As Farbotko (2010: 51-52) reveals, media reports, documentaries and research papers of 'disappearing islands' distributed throughout the cosmopolitan world not only perpetuate an imaginative geography of islands as small, remote and poor, but also establish small islands as most at risk to climate change. Within such narratives, Tuvalu has been identified as the 'canary in the coal mine', an island laboratory "on which cosmopolitans enclose a space to locate and contain climate change hopes and anxieties" (Farbotko, 2010: 58).

Bankoff (2001) reveals that there has been a long history within Western discourse of rendering parts of the world unsafe. Equatorial regions in particular have been imagined as "dangerous and life-threatening to Western people" (Bankoff, 2001: 21). Bankoff traces the sense of danger and 'otherness' attributed to tropical environments in terms of Western medicine, the political concept of development, and finally the emergence of a discourse of vulnerability and natural disaster. He argues:

> *The concept of natural disasters forms part of a much wider historical and cultural geography of risk that both creates and maintains a particular depiction of large parts of the world (mainly non-Western countries) as dangerous places for us and ours. More importantly, it also serves as justification for Western interference and intervention in the affairs of those regions for our and their sakes.* (Bankoff, 2001: 27)

In her work *Risk and Blame* (1992), Mary Douglas points out that the concept of risk is deeply entrenched within science and has contributed to building a culture that supports a new global reality. According to Douglas (1992: 23, 50-51), the calculation of risk based on probability theory has been fundamental to the development of scientific knowledge since the 17th century and has taken over from older theories of causality. She argues that whilst the idea of risk originally accounted for the probability of losses *and* gains, within a political context it now only refers to negative outcomes and could easily be replaced by the word 'danger' (Douglas, 1992: 23-25). However, unlike the concept of risk, "danger does not have the aura of science or afford the pretension of a possible precise calculation" (ibid: 25). Douglas (1992: 15) argues that the scientificity of 'risk' not only lends scientific authority to Western politics, but also accommodates new social relations and new loyalties that serve "the forensic needs of the new global culture" (Douglas, 1992: 22).

Douglas contests the use of 'risk' within the political discourse. She suggests:

> *When 'risk' enters as a concept in political debate, it becomes a menacing thing, like a flood, an earthquake, or a thrown brick. But it is not a thing; it is a way of thinking, and a highly artificial contrivance at that.* (1992: 46)

Risk as a 'collective construct' (Douglas and Wildavsky, 1982: 186) is further considered by Connell (2003: 103), who argues that 'climate change' and 'environmental risk' are concepts created by scientific and political institutions, and as such are "not unproblematic understandings of the natural world". The convergence of science and politics is apparent within the global climate change discourse; science is enlisted as expert knowledge and becomes foundational to a definition of climate change that gains political force through the activities of organisations like the IPCC. In this way, consensual (politicised) scientific predictions of future global climate change scenarios 'manufacture risk' (Giddens and Pierson, 1998: 210-11)[6] and promote 'communities of danger' (Beck, 1992: 47).

As the authoritative source on climate change, the IPCC plays a persuasive role in the categorisation and classification of places 'at risk'. In spite of scientific attention to uncertainties in climate prediction and impact modelling[7], the IPCC operates to stabilise uncertainty and present a global scientific consensus on climate change (Malone and Raynor, 2001: 174; Raynor, 2003: 283; Oreskes, 2004: 1686). According to Nurse and Moore (2007: 105), this global scientific consensus identifies small island states as "one of the groups most vulnerable to the adverse consequences of global climate change". This consensus informs and directs much of the social science research that is promoted by the IPCC and incorporated within the IPCC Working Group II Report. Such research generally concurs with those characteristics identified within the IPCC that construct small islands as risky environments. For example, researchers Barnett and Adger summarise the impacts of climate change in IPCC terms. In their paper, 'Climate Dangers and Atoll Countries' (2003), highlighted within the 'Small Islands' chapter of the IPCC report (Mimura et al, 2007: 707), Barnett and Adger frame their discussions in terms of risk and vulnerability and suggest that even with moderate climate change, "atoll environments may be unable to sustain human habitation" (2003: 326).

Similarly, in a paper entitled 'Living with a Climate in Transition', Shea (2003) constructs Pacific Islands as "vulnerable by definition"[8]. She produces an image of fragility and isolation, of small land masses surrounded by a large ocean, of places that are highly vulnerable to climatic forces (2003: 4). Pacific Island communities are positioned 'at risk' to extreme climatic events and sea-level variation that affect fresh water availability, agricultural production and marine and coastal resources. Further, researchers who are from small islands also contribute to the construction of risk through their involvement with the IPCC, including as lead authors or contributing authors, particularly within the 'Small Islands' chapter of Working Group II (Mimura et al, 2007). Clearly, there are scientists from Pacific Island countries who are actively engaged with climate change (Kelman, 2010: 607). However, irrespective of country of origin, it appears that much of the social science research on climate change and small island places that engages with the global scientific consensus on climate change as represented through the IPCC tends to assume a future of risk and uncertainty. As such, the concept of 'risk' is enlivened through the privileged discourse of climate change as presented by the IPCC and subsequently becomes, in itself, a consequence of climate change that is worthy of investigation.

A regional and national discourse

At a regional level, climate science predictions of global warming, sea-level rise and changes to the frequency and intensity of extreme climatic events are well accepted by

Small Island States in the Pacific. As early as 1989, a small number of Pacific Island countries attended the Small States Conference on Sea Level Rise organised by the government of the Maldives (see www.islandvulnerability.org). The Male 'Declaration on Global Warming and Sea Level Rise', agreed on by the conference delegates, recognised the scientific consensus regarding climate change and global warming and expressed deep concern for possible adverse effects. The delegates declared "their intent to work, collaborate and seek international cooperation to protect the low-lying coastal and island States of the world from the dangers posed by climate change, global warming and sea level rise".

The Pacific Regional Environment Programme (SPREP), an intergovernmental organisation established in the 1980s to protect and manage natural resources and the environment in the Pacific Islands region, published an overview of the implications of climate change for the South Pacific in 1991. A working group on climate change was established a few years later and, according to Kelman and West (2009), SPREP is now the "focal point for climate change" for the Pacific region. SPREP has 25 member countries and provides information, conducts research, manages projects and supports the development of policy related to climate change in the Pacific region.

Another intergovernmental organisation, the Alliance of Small Island States (AOSIS), is a coalition of 42 small islands and low-lying coastal countries from all oceans and regions of the world, including the Pacific. AOSIS primarily operates as a negotiating force on the issue of climate change within the United Nations' system. The 'AOSIS Declaration on Climate Change' (AOSIS, 2009), presented to the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP) in Copenhagen in 2009, expressed alarm that the emerging scientific evidence indicates human-induced climate change will further intensify the already experienced effects of sea-level rise, extreme weather events, coastal erosion, ocean acidification and changing precipitation patterns. During the COP, AOSIS urged the international community to adopt mitigation activities that would limit greenhouse gas emissions to a level more likely to avoid adverse climate change impacts on small island states (AOSIS, 2009; Farbotko and McGregor, 2010: 161).

The FSM is a member state of both SPREP and AOSIS and has engaged with the global discourse on climate change for many years. In 1997 the FSM produced a National Communication on Climate Change which recognises the FSM's "unique climate change vulnerabilities", and more recent government communications state that the FSM is "already among the first victims of the adverse impacts of climate change", and that "prompt and effective actions are needed to save the vulnerable homelands of the people of Micronesia" (FSM, 2008). A 'Nationwide Climate Change Policy', developed in 2009 to reduce the vulnerability of the FSM to the adverse impacts of climate change, prioritises 'mainstreaming' climate change within all government sectors (FSM, 2009). Also, non-government organisations such as the Conservation Society of Pohnpei (CSP) incorporate climate change science within its conservation projects and community education programmes. For example, local scientist Ben Namakin (2007), manager of the Environmental Education and Awareness Program (CSP) outlines the impacts of climate change on the biodiversity, culture and economy of Micronesia and suggests ways that people can 'fight global warming'.

An island engagement with climate change

Certainly government officers and local scientists we spoke with in Weno and Pohnpei revealed a high level of knowledge and concern about climate change. Whilst many are from home islands in the outer regions of the state, they now live and work in Weno and Pohnpei where they have more ready access to the global discourse of climate change. Either through their involvement in regional and international climate change negotiations (eg AOSIS), environment organisations (eg SPREP, CSP) or the development and implementation of government policies related to climate change, these officers and scientists entwine global discourse with their local experience such that 'local' and 'global' are no longer self evident categories (Lazrus, 2005). Further, Lazrus (2009: 193-194) suggests such people are 'knowledge brokers' who frame and interpret the science of climate change and act as spokespeople at the international level. Yet often such 'distantly local' people and, in particular, the institutions they work with, are presented as 'local voices' for climate change (Kelman, 2010: 607). Whilst, as Kelman (2010: 606) suggests, "*having lived* in a place provides a depth of insight that is rarely achievable through other means" (our emphasis) and connections with home island communities generally remain strong, this particular representation of 'local voices' potentially displaces those people who live more permanently in outer island communities[5].

This 'local slippage' became apparent in the doubt that government officers in Weno and Pohnpei expressed as to whether people living in the outer islands gave much attention to climate change. Lazrus (2009: 168) reveals a similar phenomenon in Tuvalu, where a government officer suggested that outer islanders do not understand climate change. However, our research on Moch Island indicated an active engagement among outer islanders with the concept of climate change. We found that in the face of climate change, people are not only deeply concerned about the potential loss of their island and/or particular places on the island, they are also worried about the loss of culture and what we call *place-based knowledge* and relationships. Similar concerns have also been documented by Lazrus (2005) and Rudiak-Gould (2010) among people living in other low lying island places in the Pacific, such as Tuvalu and the Marshall Islands. As one woman on Moch told us:

> *There is some secret place that I've been concerned about that's been affected already with high tide. It's in my village and those secret places are very related to every people here on Moch. Those places are well known for the people who are the great warriors of Moch settlement. They make a settlement here. That's where they can do their meeting before going to war.*

Sea-level rise, 'high tide', land erosion (see Figure 3), and saltwater inundation were identified as major concerns[6]. Various people interviewed on field research commented:

> *It's closest to our eyes… You see there, there is a tree, coconut tree and other kinds of trees that's already in the water. So what can we do? That was only after a few years,,,*
>
> *During the 2002 waves there were big waves coming up. There's breadfruits near the coast, on the other side of this house, they're damaged, they're dying – when the salt water came. And much of the*

food crops, like the taro patch on the other islands over there, were also totally damaged by this.

Ten years ago when I was small boy I used to dig, to work and to eat from this taro patch. Right now, no more taro. It's about five years ago we no longer use this taro patch, no longer plant the taro inside.

Figure 3: Erosion on Moch Island (photograph by Christine Pam, 2009)

Whilst the term 'global warming' (as opposed to 'climate change') was recognised, it was not a term elders readily employed in the formal interview context, nor in conversation with us. However all the people we interviewed said they had heard sea-level rise was caused by the ice melting in the North and South Poles, one commenting: "The ice, if it's frozen nothing will happen, but if it's melting there's a chance of a large amount of water".

Whilst people on Moch have not received the same level of information and education about climate change reported for other low-lying island communities (Rudiak-Gould, in press), some of the elders we interviewed did link the concept of global warming with human activities such as pollution, airplane smoke, the ozone layer and greenhouse gases, and people of all ages expressed concern that they may eventually need to evacuate their island because of sea-level rise.

The concern about evacuation was articulated indirectly in different ways, from discussions of the importance of food grown on the island, to narratives associated with significant ancestral places they feared might be inundated. In particular, people noted

that in the event of evacuation they would deeply miss their own food – while they could eat taro from another island, taro from their own place is especially valued. This desire for their own food expresses the intense sociality of land and food on Moch. Marshall, in relation to his ethnographic research in the neighbouring atoll of Namoluk, discusses the symbolic linkages of kinship, land and food as follows:

> *Namoluk kinship and marriage is grounded in land… To survive on an atoll one must have access to land, for it is the source of food… This equation of land with food is explicit in the way chon Namoluk refer to land… 'food: to eat'… As is common throughout Micronesia, and in many other parts of the Pacific, kinship is commingled with land. Just as with shared blood, to share land with someone is ipso facto to share kinship. This equation of "mud and blood" is pertinent here because it helps us understand the passionate attachment that most Namoluk people have to the atoll as a physical place – pieces of land – that in turn help to define who they are as individuals and as a people.* (2004: 38-9)

Marshall (1999: 125) argues that it is impossible to fully understand Micronesian kinship without attending to the meanings of land and food in these societies. He notes that kin are defined as those who share land and food, and posits the 'mud, blood and grub' hypothesis to elaborate the symbolic linkages of kinship, land and food. Not only does the preparation and distribution of food grown on shared land define who is kin, such food also represents the kin group at community events such as weddings, funerals and major holidays.

Our fieldwork on Moch Island evidences a similar relationship between land, people and food. Food production and preparation is crucial in the expression of social relationships. The intimate link between land, food and kinship and the value of the principles of reciprocity, generosity and balance in terms of sharing the produce of the land and sea is expressed in the Mochese myth of an ancestral being of the Sowmoch Clan, named Imailuk. Imailuk was a giant who greedily consumed all the food on Moch and then started eating all the people. He consumed all the members of his clan, except for his brother. Imailuk's brother escaped to the uninhabited island of Apuson, which lies beyond the island of Afren, between Moch and Kutu. The giant followed, and his footprint can be seen on the reef between Moch and Afren. Fishermen on Apuson saw the giant coming for his brother and prepared a trap. They cooked a big feast of fish, breadfruit, and coconut, and when the giant arrived they kept feeding him until he was so full that he fell asleep. Once he was asleep the fishermen tied his hands and feet to a breadfruit tree. They heated basalt stones on the fire and poured these hot stones down the giant's throat until he died. The place where the giant struggled is now the taro patch on Apuson.

The centrality of named places associated with the myth reflects a sentiment of attachment to place. In relation to his research on Namoluk, Marshall (2004: 10) suggests that "humans imbue particular places with names, with a history, and with emotional attachment". We found a similar attachment to named places on Moch, expressed, as mentioned earlier, through place based narratives that hold historical knowledge and meaning. As Lazrus (2005) found for Tuvaluans in relation to the problem of climate change, people on Moch also appealed to cultural attachments to place and, in particular, expressed deep concern about the loss of significant places. We were told that the names of places on the island carry meaning and a narrative history that should be recorded and stored safely for the sake of future generations, in

case evacuation becomes necessary. One person told us that if waves destroyed the island then there would be no history and another expressed concern he would no longer be able to pass on his place-based knowledge and experience to his children.

On Moch, land is highly valued and people continue to actively work to nurture the land, the taro patches, and to protect their islands from the encroaching sea. The building of sea walls has become common practice since the 1970s and, subject to resources, homes and community buildings are increasingly built of concrete with the idea that they are more effective against storm surges and typhoons. Other means that people use to keep the sea at bay and to protect themselves and their land from high tides and storm surges include the practice of hanging holy water and rosary beads on the foreshore and practices of sociality that provide insurance against risk.

Certainly their *particular* home islands provide a fundamental basis for people imagining and practicing flows of connection that link them in a wider universe of social exchange. Most people on Moch have kin living on the principal high island of Weno, and many also have kin in Guam, Hawaii and the mainland of the United States. The family with whom we stayed on Moch had daily radio contact with kin on Weno, where an 'uncle' maintains a strong family base from which various exchanges occur. People with medical needs stay with family on Weno during their treatment and children are often sent to live with relatives to attend school. The people we spoke with on Moch indicated that whilst their children living further afield in Guam and the US occasionally send items to them, it is from their family members on Weno that they receive most support during difficult times. Indeed, having an established community on the principal high island of Weno has become increasingly important for Mochese families, as Connell (1986: 45) has noted is also the case for other atoll populations. Also, in relation to subsistence practices, the people of Moch have access to neighbouring uninhabited islands in Satawan atoll from which coconuts and firewood are gathered, taro is grown, and fish and crustaceans are taken from the surrounding reef. In addition, Moch residents have access to resources through trade and exchange relationships (including relationships of enmity) with other island communities in Satawan Atoll, the Mortlocks region, and across to Chuuk Lagoon and the Western Carolines.

The historical depth of these inter-island relations is revealed in stories about the establishment of particular clans on particular islands and various narratives of place. For example, we were told that a girl from the Sor clan was taken from Kutu ('found on the reef') and when she was old enough, she married a man from the Sapunipi clan on Moch. Her husband gave her land, and when her three daughters married men from Moch, their husbands also gave them land. She also had three sons who became Moch warriors in the civil war against Kutu. The story of the 'civil war' between Moch and Kutu over the uninhabited islands that extend between the two islets was a prominent feature of a number of the places we were shown and was obviously an important aspect of their past relations with Kutu. We were told by Sor clan members that these Moch warriors were brave men, and we were shown the place called Amoreing where the men's warrior house was sited during the war with Kutu. Amoreing is an important place for members of the Sor clan. Not only is it a place where decisions were made and strategies planned during the war with Kutu, but it is also a place enmeshed with the establishment of the Sor clan on Moch, where the three sons of the woman originally from Kutu consolidated their identities as Mochese through their alignment with Moch against Kutu.

Social networks of support and environmental variability

Paul D'Arcy (2001, 2006) has provided historical evidence of this extended social universe in Micronesia well before European colonialism, particularly for the region of the Western Caroline Islands. He describes the vibrant history of regional trade and ceremonial exchange, including the 'sawai system' centred on Yap, which still operates today and for which there exists a rich ethnographic record, and the *hu*, a system of semi-annual exchanges between Lamotrek, Elato and Satawal (D'Arcy, 2001: 165; 2006: 144-56). While D'Arcy's focus was not on the Mortlock Islands, he does note that they were linked into the trade system, with Etal Atoll providing highly sought after spondylus shell valuables (2001: 169, 173; 2006: 148). Similarly, Gladwin (1970: 38) notes more recent canoe trips from Puluwat Atoll in the Western Islands of Chuuk State to the Mortlock Islands. The cultural significance of these regional ties is evidenced by the *named* sea lanes between particular island destinations, recorded and remembered in navigational chants. Marshall evidences the historical depth of exchanges of Chon Namoluk (people of Namoluk) beyond their island home. Chon Namoluk "have historical trading ties" to a village on Weno (Chuuk Lagoon) and "links to Puluwat atoll via multiple marriages and a shared lineage" as well as "marital connections with the Morlockese settlements on the island of Pohnpei" (Marshall, 2004: 9).

There are numerous mentions in the literature of support and assistance rendered to atoll communities by neighbouring atolls and islands in the aftermath of natural disasters such as cyclones (Nason, 1975; Alkire, 1978). According to Nason:

> *even in times of war, Etal would render assistance to both ally and enemy communities if they were struck by a natural disaster, eg, typhoon. The assistance offered would include food or long-term care for refugees from the stricken community. The Etal community, of course, was similarly aided.* (1975: 122)

Campbell (2009) identifies such practices as 'traditional disaster reduction measures'. He states:

> *These are social, cultural, political and technical elements of traditional communities that reduced the effects of natural extremes. Many of these practices existed as everyday features of community and household life.* (2009: 86)

According to Campbell (2009: 90), the key elements for traditional disaster management were food security, community and inter-island cooperation, and settlement protection. Whilst island communities have changed, along with practices that moderate the effects of disaster, the key elements identified by Campbell are still apparent. Marshall (1979: 271) discusses the extent of support between islands following the destruction caused by Typhoon Pamela in 1976. Food and supplies were smuggled onto the government relief ships by people on Weno to help relatives and friends on the damaged islands in the Mortlocks. Marshall admonishes the disaster relief programs for failing to support what he identifies as "mutual help attitudes" and "local attempts at self-sufficiency" following the disaster (1979: 271).

Indeed, peoples of Micronesia have long had to deal with climate variability and a dynamic and changing seascape. Nunn (2000) reports on the environmental and human effects of the A.D. 1300 climate change event in the Pacific Islands. He outlines major

changes in settlement patterns, food resources and long-distance voyaging, and suggests the event had major impacts on Pacific Island cultures (2000: 734-736). Rainbird (2004: 94, 171) also presents archaeological evidence of the human transformation of islands as well as practices of protection and maintenance of the shoreline. He notes that initial settlers of low islands purposefully altered the landscape to create conditions to support subsistence systems (Rainbird, 2004: 95). As Henry and Jeffery point out, this archaeological record of environmental and cultural change in the Pacific evidences "past human resourcefulness in the face of life in a highly dynamic natural environment" (2008: 15). Such resourcefulness included developing social networks of support across the seascape as described above.

Climate change 'risk' and agency

These social networks can be understood as a particular expression of knowledge and practices that reduce uncertainty in the face of environmental variability. However, despite the continuity of beliefs and practices that have sustained an ongoing lived relationship with a place intermittently threatened by past climatic events, people we spoke with on Moch tended not to identify such long held beliefs and practices as meaningful in the face of climate change. Instead, people articulated a sense of helplessness in response to an imagined future of big waves, land erosion and island evacuation. People clearly felt ill equipped to respond. Many people asked 'What can we do?', 'Where can we go?', a sentiment also expressed by Tuvaluans (Lazrus, 2005). One person on Moch told us "I wish that those people out there they will see our problem here. Because we don't know what can we do – just small islands here."

Imagined as different to past experiences, climate change transforms a known place into an unknowable space. How might we understand these anxieties about the future articulated by Moch people in relation to climate change? Beck's concept of 'global risk society' provides some interpretive insights[6]. Beck (1992: 21) defines risk as a "systematic way of dealing with hazards and insecurities induced and introduced by modernization". Unlike older hazards which involve localised personal risk, he argues that in the risk society, risks are global in their extent/threat and the "unknown and unintended consequences come to be a dominant force in history and society" (Beck, 1992: 22). As Lahsen puts it: risk society involves a "pre-occupation about largely future-set environmental threats and other insecurities created by modernization itself" (2007: 9). Certainly climate change is a prime expression of 'risk society'.

Beck's concept of risk concerns the globalisation of doubt and uncertainty. It characterises a peculiar state between security and destruction where "the perception of threatening risks determines thought and action" (Beck, 2000: 213). Importantly, Beck argues that:

> *The concept of risk reverses the relationship of past, present and future. The past loses its power to determine the present. Its place as the cause of present day experience and action is taken by the future, that is to say, something nonexistent, constructed and fictitious.* (2000: 214)

We are interested in how this relationship between past, present and future in the context of climate change is presently articulated on Moch Island. Here, Dwyer and Minnegal's (2006) assertion of a distinction between risk and uncertainty may be useful.

Dwyer and Minnegal (2006) examine decision-making in various contexts of incomplete information among ocean-going commercial fishers living in a small coastal town in southern Australia. They distinguish between 'risk' as a calculable event, which is conducive to agency, responsibility and decision making, as in the concept 'taking a risk'[ii], and uncertainty, which arises in contexts in which actors are not able to assess the likelihood that events will occur. Being able to assess the likelihood that events will occur reduces uncertainty (Dwyer and Minnegal, 2006: 2).

Dwyer and Minnegal (2006) analyse the ability of fishers to make decisions in contexts of the physical and biological environment, the economy, and fisheries management. They argue that whilst past experience, knowledge and skill underpin a fisher's ability to 'quantify' and engage with 'risks' posed by the environment, decision-making in the context of fisheries management operated in the realm of uncertainty and contributed to feelings of insecurity and loss of control (2006: 14-15). Dwyer and Minnegal conclude that the uncertainties embedded within "a future- and globally-orientated scientific and management structure" will always be problematic for fishers who are necessarily reliant on a "past-, experientially- and locally-orientated industry" (2006: 15, 17).

We argue that the future- and globally-orientated discourse of climate change introduces a context in which events become unknowable and agency to reduce uncertainty is diminished. Indeed, at the local level, climate change discourse has the potential to stifle agency and inhibit people's ability to draw on established local knowledge and practices in response to climatic events. Not only does the discourse of climate change promote uncertainty as it attempts to predict a future for low lying islands, but also the meaning of 'risk' loses its agential possibility. Within the discourse, 'risk' becomes a future orientated 'uncertain danger' and as such, contributes to a sense of instability and helplessness that leads people astray from those modes of sociality and practices effective in an everyday engagement with a changing environment. Thus, the environmental changes experienced by people on Moch converge with the discourse of climate change. No longer anchored in past knowledge and experiences, these environmental changes are imagined differently; and this imaginary has real consequences. As in the words of a man on Moch: "In the deepest of my heart I really need to move out from this place … Seems like if I stay that means I suicide myself here."

Lazrus (2009: 169) reminds us that the impacts of climate change on low-lying islands (sea-level rise, extreme events, changes in weather patterns, etc.) may be unprecedented in both character and degree, and as such may not be analogous with accumulated local knowledge conducive to adaptation to environmental changes. She suggests:

> *it is clear that elements of the past that are embodied in traditional knowledge are important for perceiving contemporary change. However, the extent and novelty of change may mean that past experience is necessary but not sufficient to act as a guide to the future.* (Lazrus, 2009: 169)

Our argument is not that these unprecedented environmental changes are not happening, but rather that the changes are constituted differently in the context of uncertainty embedded within the global climate change discourse. Not unlike the fishers in Dwyer and Minnegal's ethnographic work (2006), environmental variability and change is a reality that people on Moch have always known. However, climate change

discourse has introduced a sense of powerlessness. People feel defenceless in the face of something that they feel is out of their control. As such, while we are not suggesting that climate change itself is a fiction, an engagement with the discourse of climate change is problematic for some because in the moment of that engagement the everyday knowledge and practices that have sustained community life for generations are relieved of their power to determine a secure present.

End Notes

1. A further period of fieldwork has since been conducted by Christine Pam in relation to her doctoral research. Her ethnographic insights have informed our interpretation of the material from this study.

2. See, for example, the documentary on Tuvalu, screened by the Australian Broadcasting Corporation (ABC) on 7th Feb 2007 entitled *Paradise drowned: Tuvalu the disappearing Nation.*

3, "Manufactured risk is risk created by the very progression of human development, especially the progression of science and technology… Science and technology create as many uncertainties as they dispel – and these uncertainties cannot be solved in any simple way by yet further scientific advance'" (Giddens and Pierson, 1998: 210).

4, See Kench and Cowell (2001), and see Nowotny (2005) for uncertainties in scientific research generally.

5, The main source for this paper is a report produced by the East West Center at the University of Hawaii (Shea et al, 2001). This report was included in the 'Small Islands' chapter of the IPCC report (2007).

6, Both Rudiak-Gould (in press) and Lazrus (2009: 199) discuss discrepancies between regional and national discourses and island community experiences. In the context of environmental catastrophes, Rudiak-Gould (in press) warns that a focus on the long term resilience of regional populations should not blind us to the fact that many people died and entire island communities were wiped out. Also, in her analysis of national identity, territory and climate change, Lazrus (2009: 199) makes the distinction between vulnerable islands and a resilient nation.

7. Similar concerns reported from other islands in the Mortlocks in relation to particular weather events have been discussed in the context of climate change (Keim, 2010).

8, Although climate change was not the only explanation given for the loss of Bōn, a significant place for the Shark People of the Marshall Islands, Rudiak-Gould (2010) presents a detailed examination of climate change and the cultural attachment to place.

9, D'Arcy mentions that even after ceasing their visits, old links between Lamotrek and Guam were able to be re-established via a seaway named Mutau-uol, remembered in a navigational chant (2006: 157)

10, Beck defines 'risk society' as the global phenomenon in which "modernity becomes reflexive, which means concerned with its unintended consequences, risks and their implications on its foundations" (2000: 226).

11. Dwyer and Minnegal (2006: 2) invest 'risk' with the potential for opportunities and rewards (risk equals accident by probability), and suggest this differs from the

'vulnerability' equation whereby risk equals hazard by vulnerability. Lazrus (2009: 179-180) defines risk as a "subjective product of hazard and vulnerability which is also differentially experienced by different people", taking into account cultural background, history, political position, knowledge and perception. Further selected definitions of 'risk' are also presented by Kelman (2003: 7).

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